MINOR IN SCIENTIFIC AND ENGINEERING COMPUTING

The Scientific and Engineering Computing minor provides undergraduate students with computational and numerical skills and knowledge to augment their studies in their major programs. Core courses in mathematics and computing provide broad, general skills in numerical methods, algorithms, and scientific software development. Elective courses provide depth in applying numerical computation to problems in the field of the student's major.

Computational methods are now used routinely in virtually all fields of science and engineering, and are becoming more common in the social sciences. They have become essential to understand natural and human-created phenomena and systems. Computation has been described as the third paradigm for scientific discovery and innovation, along with theory and experimentation. A minor curriculum in computation is a natural complement to major programs in science, engineering and the social sciences.

Minor Program of Study & Guidelines

Program of Study

A CS Minor application is required.

The Scientific and Engineering Computing minor must comprise at least 15 credit hours, of which at least 9 credit hours are upper-division coursework (numbered 3000 or above).

Code	Title	Credit Hours
Prerequisites		
	Math through Calculus III and Differential Equations	
CS 1331	Introduction to Object Oriented Programming [1]	
Required Courses		
CX 4010	Computational Problem Solving for Scientists and Engineers [2,4]	3
Numerical Methods		
Select one of the following: [3]		3
AE 3090	Numerical Methods for Aerospace Engineering	
CHBE 2120	Numerical Methods in Chemical Engineering	
CX 4640	Numerical Analysis I	
MATH 4640	Numerical Analysis I	
ME 2016	Computer Applications	
MSE 3025	Statistics and Numerical Methods in Materials Science and Engineering	
Intro to Parallel Computing		
Select one of the following:		3
CX 4220	Introduction to High Performance Computing	
CX 4777	Introduction to Parallel and Vector Scientific Computing	
MATH 4777	Vector and Parallel Scientific Computation	
Electives		
Select two of the following:		6
AE 4040	Computational Fluid Dynamics	
AE 4132	Finite Element Analysis	
BMED 4783	Introduction to Medical Image Processing	
CS 4710	Introduction to Computing Concepts for Bioinformatics	
CX 4140	Computational Modeling Algorithms	
CX 4230	Computer Simulation	
CX 4240	Introduction to Computing for Data Analysis	
CX 4641	Numerical Analysis II	
CX 4777	Introduction to Parallel and Vector Scientific Computing	
CX 4803	Special Topics in Computational Science and Engineering (Computational Sustainability)	
ECE 4580	Computational Computer Vision	
ECE 4783	Introduction to Medical Image Processing	
ECE 4823	Special Topics (Computational Methods in Electrical Engineering)	
MATH 4261	Mathematical Statistics I	
MATH 4305	Topics in Linear Algebra	
MATH 4581	Classical Mathematical Methods in Engineering	
MATH 4641	Numerical Analysis II	
MATH 4777	Vector and Parallel Scientific Computation	
ME 4342	Computational Fluid Dynamics	
NRE 4234	Nuclear Criticality Safety Engineering	
PHYS 3266	Computational Physics	
Total Credit Hours		**15**

[1] CS 1331 is a pre-requisite for the minor and must be taken, but not included in the required 15 credit hours. A grade of A or B is required.

[2] Computer engineering students should take both CX 4220 and CX 4777/MATH 4777 rather than CX 4010.

[3] If Numerical Methods is required by the student's Major, then the student may take an additional elective. Numerical Methods courses include (ECE and computer engineering students are restricted to taking AE 3090, CX 4640/MATH 4640, or MSE 3025)

- No Special Problems or Internships coursework may be used towards the CS minor.
- A grade of A or B is required for CS 1331. All courses used to satisfy the course requirements for a minor must be completed with a grade of C (2.00) or better.
- All courses counting toward the minor must be taken on a letter-grade basis.
- A maximum of 3 credit hours of transfer credit may be used to satisfy the course requirements for a minor. This includes courses taken at another institution or credit earned through the AP or IB program, assuming the scores meet Georgia Tech minimum standards.
- It is the **major advisor's responsibility** to verify that students are using only courses from the designated block(s) from the student's major field of study that are allowed to satisfy a minor program, that they are not using any Core Area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Any free elective course used to satisfy the course requirements of the student's major degree program may also be used to satisfy the course requirements for a minor.